



Advancing Science in the Bureau of Land Management

National Science Committee Annual Report

Fiscal Year 2016



The BLM’s Advancing Science Vision

The BLM is a resource management agency that uses science as one of the critical inputs in its decisionmaking processes at every level. BLM managers and specialists deliberately obtain and apply mission-oriented science in every office, in every program, and in every project.

National Science Committee (NSC) Mission Statement

The mission of the NSC is to lead the BLM’s ongoing efforts to advance science and integrate science into daily work as a sound foundation for informing the BLM’s decisionmaking. In accordance with the Strategy, the NSC embraces the two following goals:

- 1. Ensure effective and consistent science integration into the BLM’s core work processes.
- 2. Ensure that relevant, timely scientific information is accessible to BLM staff and managers.

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ADVANCING SCIENCE IN THE BUREAU OF LAND MANAGEMENT

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National Science Committee Annual Report

Fiscal Year 2016

National Science Committee

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EXECUTIVE SUMMARY

The Bureau of Land Management (BLM) is committed to science-based decisionmaking and recognizes that seeking out and integrating credible science into land management is essential for sustainable management of the nation's public lands. Toward this end, the National Science Committee was created to help accomplish the goals of the BLM's strategy for advancing science (published in "Advancing Science in the BLM: An Implementation Strategy"). This report summarizes the NSC's accomplishments during fiscal year (FY) 2016 and highlights priorities for FY 2017.

The NSC's most notable accomplishments during FY 2016 included the following:

- Understanding staff needs via a science survey to which more than 1,850 employees responded.
- Enhancing science communications and visibility through frequent BLM Daily articles, blogs, and "I am BLM" stories.

- Developing the web-based Science in Practice Portal.
- Developing the "Principles and Practices of Integrating Science into Land Management" Guidelines, Desk Guide, and six Case Studies, to help BLM field employees understand better how to advance the use of science in their daily work. This guidance was transmitted in 2017 under IM-2017-030.
- Expanding science partnerships and citizen science through deployment of the federal citizen science toolkit and planning for a BLM citizen science pilot program to be implemented in FY 2017.
- Incorporating priority science needs into the annual budget process.
- Supporting Greater Sage-Grouse science.



INTRODUCTION

The Bureau of Land Management (BLM) recognizes that sustainable management of the nation's public lands requires decisions based on credible science. In March 2015, with approval from the Executive Leadership Team (ELT), the bureau published a strategy for putting into practice the BLM's commitment to finding valid science and integrating it into core work processes and decisionmaking. The full title of the Strategy (hereinafter referred to as the "Advancing Science Strategy" or "Strategy") is "Advancing Science in the BLM: An Implementation Strategy."

Responsibility for pursuing the Strategy's goals and implementing action items resides with the National Science Committee (NSC), which the BLM chartered when the Strategy was published. The BLM's Advancing Science Vision is that the BLM will use science as a critical input into decisionmaking at every organizational level. That is, BLM managers and specialists proactively obtain and apply mission-oriented science in every office, program, and project. The NSC's mission is to lead the BLM's ongoing efforts to advance science and integrate science into daily work as a sound foundation for the BLM's decisionmaking.

This report summarizes the NSC's "Key Accomplishments" during fiscal year (FY) 2016 and the status of important work begun in FY 2016 and currently "On the Horizon."

The NSC Inaugural Meeting (November 2015) identified the following priorities for action during FY 2016. This report summarizes progress made on each priority action.

- Determine staff needs through a bureau-wide science survey.
- Enhance science communications and visibility.
- Develop the Science in Practice Portal (a web-based "Science One-Stop").
- Create practical guidance on how to integrate science into land management.
- Support Greater Sage-Grouse science.
- Expand the bureau's use of science partnerships and citizen science.
- Incorporate priority science needs into the annual budget.
- Increase science proficiency of staff.



National Science Committee (Inaugural Meeting).

SCIENCE INFORMATION SURVEY

A first step to putting the Advancing Science Strategy into practice was to understand how BLM staff have been accessing science and to identify their needs for science to support decisionmaking.

Key Accomplishments

The NSC, under the leadership of BLM field scientist Stephanie Miller, created a survey that would support these goals and that would help inform the functional and content requirements of the bureau's Science in Practice Portal (described further below). A total of 1,853 employees responded to the survey, which was sent by Deputy Director Steven Ellis in February 2016. Almost 1,000 narrative comments were also received.

This high level of employee response to the survey helped the NSC develop recommendations for the ELT about how to overcome existing challenges to meeting the Advancing Science Strategy's goals. It was also key to the NSC's design of the Science in Practice Portal. Finally, the survey drew more than 70 volunteers from the workforce, who will continue

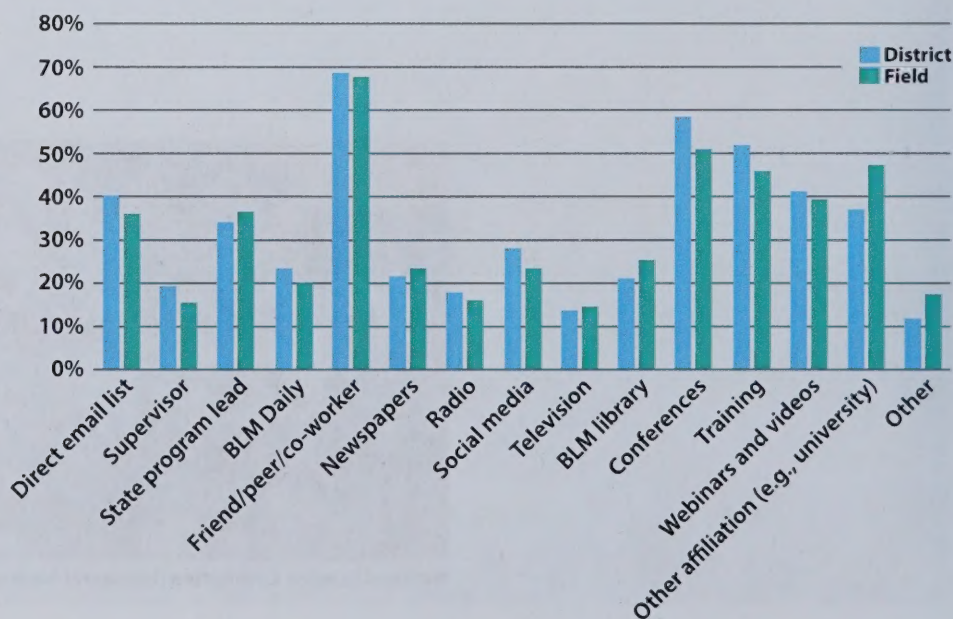
to provide feedback and ideas as the NSC builds a long-lasting commitment to science-based land management in the bureau.

Key Findings: The vast majority of field staff who responded (91 percent) use science to inform decisionmaking. Most use some form of personal communication—see the breakout in Figure 1—to stay current in their field. These results emphasize the critical importance of maintaining professional networks and supporting attendance at statewide workshops, professional meetings, and technical trainings.

On the Horizon

- Science Information Survey Synthesis Report (to be posted on the Science in Practice Portal); survey highlights will be published in a 2017 BLM Daily article.
- NSC presentation to the ELT, including its report of challenges identified in the survey results and its recommendations for accomplishing Advancing Science Strategy goals.

Figure 1. Primary Access to Science: Personal Communication.



SCIENCE COMMUNICATIONS

Communicating with employees about available science is central to advancing the use of science across the bureau. When high-quality information is visible, accessible, and understandable, managers and specialists are more likely to put it to use.

Key Accomplishments

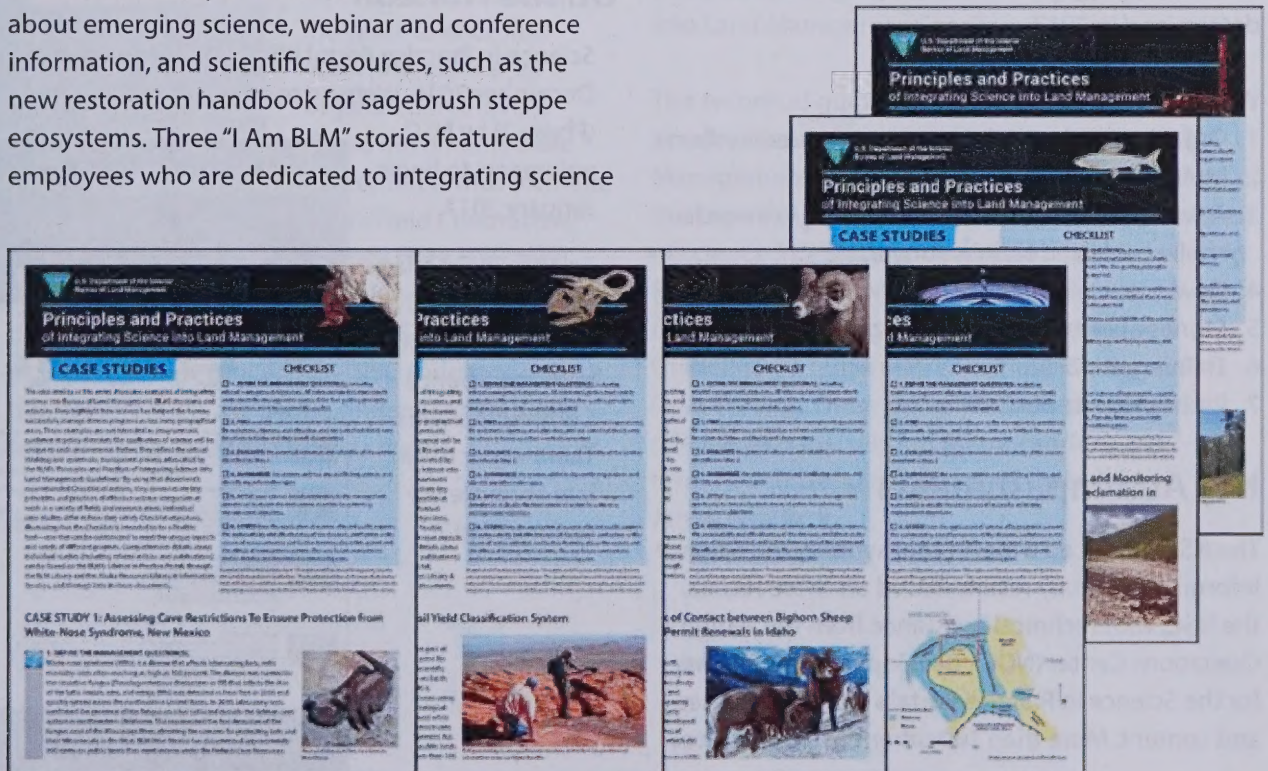
NSC Communications Advisor Greg Fuhs led the NSC communications team in carrying out a dynamic communications plan. The team was assisted by BLM public affairs specialists (and their own national communications strike team); regional and state science coordinators; and the Core Science Forum, which provides a venue for discussing science to inform land management.

The NSC has strategically used the BLM Daily, in particular, as a means of communicating important information to employees. In FY 2016 the NSC showcased 5 stories demonstrating science-related successes and lessons learned in the Advancing Science Series. It published 12 new Science Alerts about emerging science, webinar and conference information, and scientific resources, such as the new restoration handbook for sagebrush steppe ecosystems. Three “I Am BLM” stories featured employees who are dedicated to integrating science

in their work; two stories highlighted NSC member field scientists. The BLM Daily has also carried NSC reports and blogs.

On the Horizon

- Rollout of the “Principles and Practices of Integrating Science into Land Management” products, which include an Instruction Memorandum (IM), the full Guidelines, a quick reference Desk Guide, and six Case Studies.
- Videos and webinars supporting Advancing Science Strategy goals.
- Ongoing communications showcasing case studies that demonstrate science-related success stories and partnerships.
- Policy changes reflecting the BLM’s commitment to science-based land management and a landscape approach (through coordination with the Department of the Interior’s Office of Policy Analysis).



SCIENCE IN PRACTICE PORTAL

Advancing Science Strategy (Strategy 2.1, Action 1)

Establish the BLM "Science One-Stop" website to more broadly and consistently communicate relevant science results, examples of science-land management integration, and science partnerships on a routine basis (e.g., access to relevant scientific journals, monthly science Wednesdays on the BLM Daily, webinars, online monthly or quarterly BLM science publications, technical notes, science-land management integration resources and links).

This website will provide employees a central location for accessing important science information resources. Its design reflects employee input from the Science Information Survey regarding the features and content they need in order to obtain and use science information more effectively. The NSC's goal was to make the website intuitively easy to use and to ensure that it is well maintained. Responsibility for maintaining website content, which is expected to be shared by various Washington Office (WO) programs, will be determined in 2017.

Website Features and Content:

1. Organization by topic/program areas/ecosystem
2. Multiple website search ability
3. Advanced search function (including keywords, spell-check, and terminology use)
4. New science highlights
5. Stories about how BLM is using science
6. Training opportunities
7. Partnership opportunities

Key Accomplishments

The NSC produced a report that synthesized Science Information Survey results. Based on these results, the NSC, with technical assistance from the National Operations Center (NOC), developed requirements for the Science in Practice Portal's features, themes, and content. More than 100 other science websites

were also reviewed to inform these efforts. Website planning and implementation, including content development for identified website themes, was led by a project manager detailed to the NOC, who worked with the NSC website subcommittee, the BLM Library, and other NOC staff. The NSC also worked with the NOC's Division of Information Resource Management to develop contract requirements resulting in the award of a contract for professional website design.

Website functionality is emerging under a two-phased plan. Phase 1 efforts focused on creating a solid platform able to organize existing information and to make it accessible. More dynamic functionality—e.g., advanced search capability, training modules, and interactive forums for peers and science experts—will be added during Phase 2. NSC survey volunteers will help test Phase 1 results and participate in developing content and refining functionality for Phase 2.

On the Horizon

- Science in Practice Portal (Phase 1), completed in December 2016. Website testing and refinements (Phase 2) by NSC volunteers to begin January 2017.
- Science in Practice Portal (Phase 2), rollout coordinated with the Science Communications Team expected in late spring/early summer 2017.



GUIDANCE ON INTEGRATING SCIENCE INTO LAND MANAGEMENT

Advancing Science Strategy (Strategy 1.1)

Adopt, publish and communicate the five principles and practices for more consistent science integration into land management core work processes.

Advancing Science Strategy (Strategy 1.1, Action 4)

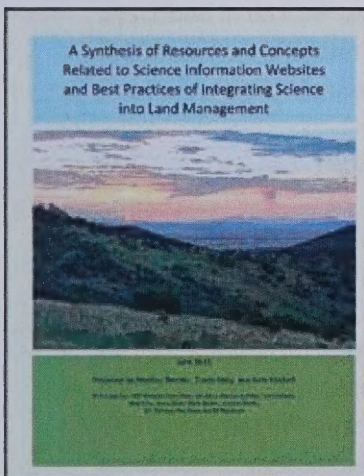
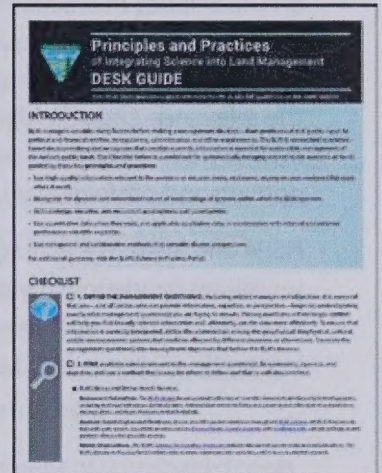
Produce a technical guide and associated online training modules with explanations on how the five principles and practices of science are applied in land management. This guide will showcase effective examples of science-land management integration involving partnerships at various scales.

Key Accomplishments

The NSC conducted a comprehensive review to identify other agencies' best practices for integrating science into land management. The NSC determined that no other federal department or agency has articulated a process for integrating science into its work processes and none has created cross-cutting, interdisciplinary guidance.

Many agencies have issued guidance on similar concepts in planning and assessment documents, however. The NSC synthesized this review into a report, which was used to help develop products in the "Principles and Practices of Integrating Science into Land Management" series.

The technical guidance contained in the "Principles and Practices of Integrating Science into Land Management" products demonstrate how BLM managers can use the five principles and practices of science integration (described in the Advancing Science Strategy) when applying science to land management questions. The NSC developed Guidelines, a quick reference Desk Guide, and six Case Studies. These materials were prepared for release with [Instruction Memorandum 2017-030](#) from Acting Deputy Director of Operations Jenna Whitlock.



An NSC subcommittee focused on creating practical guidance for integrating science into land management to help all employees routinely integrate science into work processes at all organizational levels. These documents were coordinated with the field, BLM's Field Committee, deputy state directors

for minerals and resources, Washington Office directorates, and the Solicitor's Office. Through this extensive review process, the NSC sought to ensure that the products are useful, understandable, and supported by BLM managers and staff.

On the Horizon

- “Principles and Practices of Integrating Science into Land Management” Guidelines, Desk Guide, and Case Studies (rollout January 2017).
- Additional resource support tools to be released on the Science in Practice Portal, explaining how to define management questions effectively; how to conduct a literature search; how to evaluate the relevance and reliability of a scientific study/article; what constitutes science; and how personal opinion and professional judgment differ.
- NEPA and Resource Management Plan (RMP) templates/guidance to incorporate guidance found in the “Principles and Practices of Integrating Science into Land Management.”
- Annual or biennial evaluation of the Guidelines and Desk Guide for “Principles and Practices of Integrating Science into Land Management” to identify opportunities for improvement (October 2017).
- Additional website information, resource support tools, and training to help BLM staff understand and use the “Principles and Practices of Integrating Science into Land Management.”
- Design of an NSC program to highlight and endorse work that implements the “Principles and Practices of Integrating Science into Land Management.”
- A scientific integrity and peer review policy for the BLM, consistent with directives from the Office of Management and Budget.



INTEGRATING SCIENCE AT A GRAND SCALE: GREATER SAGE-GROUSE AND SAGEBRUSH ECOSYSTEM

On September 22, 2015, the Secretary of the Interior announced that the Greater Sage-Grouse was not warranted for listing under the Endangered Species Act (ESA) due to an unprecedented, landscape-scale conservation effort across the western United States that would significantly reduce threats to this species across 90 percent of its breeding habitat. This effort—founded on a collaborative, science-based Greater Sage-Grouse strategy—has become the largest land conservation effort in U.S. history. During FY 2016, the BLM focused on implementing that strategy. Relying on relevant and reliable science, the BLM carried out the commitments described in 68 RMP revisions/amendments and the requirements of Secretarial Order 3336, "Rangeland Fire Prevention, Management and Restoration."

Key Accomplishments

During FY 2016, the NSC supported implementation of the Greater Sage-Grouse strategy by reviewing many interagency documents that were instrumental in (1) improving science resources about the sagebrush ecosystem; (2) improving monitoring of the sagebrush-steppe ecosystem condition as well as the effectiveness of fire prevention, fire suppression, and habitat restoration; (3) developing a Conservation and Restoration Strategy for the sagebrush ecosystem, including a Common Science Framework for assessing threats and setting priorities; and (4) creating a tracking system for conservation actions performed under Secretarial Order 3336. The NSC also assisted in initiating a science-based seed strategy for sagebrush restoration and rehabilitation.

On the Horizon

- Implementation of a partnership agreement between the BLM and the Intermountain West Joint Venture to prioritize conservation treatments across the landscape, measure effectiveness, and transfer decision support tools to managers.
- Continued collaboration with other agencies, partners, and nonprofit organizations in the development of a Conservation and Restoration Strategy for the sagebrush ecosystem.
- Completion and refinement of web-based tools to make it easier for BLM staff to use data, maps, and models developed for the Common Science Framework.
- Science in Practice Portal highlights of science associated with sage-grouse, and easy-to-use links to the fire science exchange.



Male sage-grouse.

SCIENCE PARTNERSHIPS AND CITIZEN SCIENCE

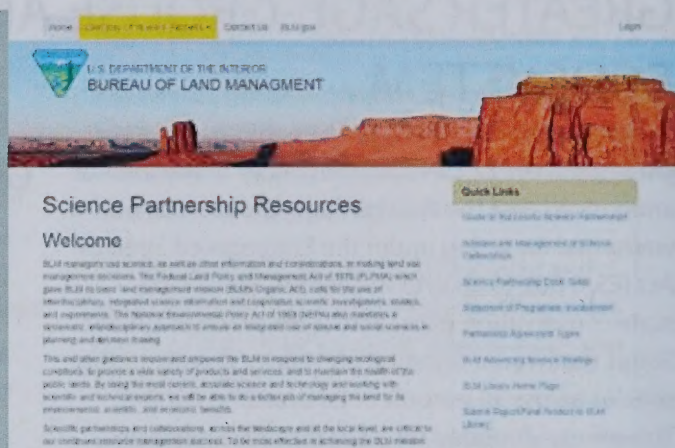
Advancing Science Strategy (Strategy 2.1, Action 2)
Develop standard language that can be incorporated into partner agreements and contracts that require data management plans and science results. The standard language should clearly establish that products address management questions, should be understandable to managers, and should be applicable to land management.

Advancing Science Strategy (Strategy 2.2, Action 5)
Strengthen BLM scientific engagement with the public by piloting a citizen science program with the NLCS, with the aim of instilling citizen science as standard practice across the BLM.

The Advancing Science Strategy recognizes that “cultivating and sustaining science partnerships is vital. . . . The BLM should continue to engage in partnerships that align science activities with BLM management needs and produce results that can be readily accessed, interpreted, and applied by BLM managers and staff.” In FY 2016 the NSC built on the BLM’s long history of science partnerships by providing guidance on how to establish and maintain science partnerships that are increasingly responsive to the BLM’s needs and by making it easier to find existing funded partners through a web-based resource.

Key Accomplishments

The NSC launched the Science Partnership Resources website at <http://web.blm.gov/science-partnerships/>. Initiated as a BLM Leadership Academy project, and completed under the leadership of NSC member Stephanie Miller, the website contains information about creating and managing a partnership, sample agreement and contract language, a Directory of Science Partnerships (including current partner



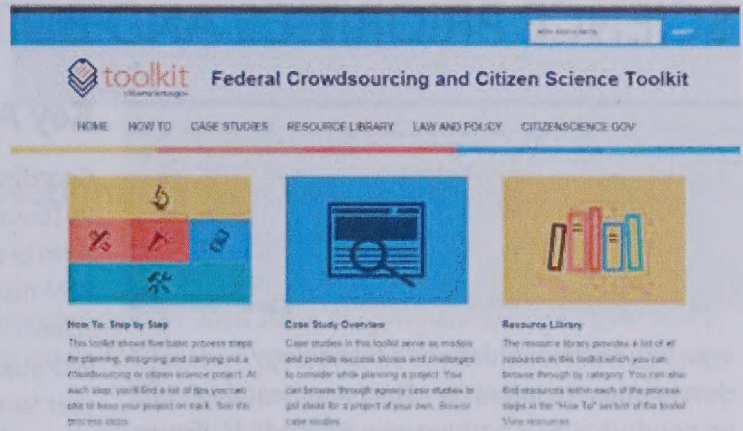
agreements, a searchable database, and partners and the types of work they perform), and stories from the field about successful partnerships.

The NSC also developed materials to help teach BLM staff how to create and manage a science partnership that will yield relevant and easily accessible deliverables: IM 2016-074, “Guidance for Developing Effective Science and Research Partnerships and Products that Support Bureau of Land Management Decisions,” and an associated Desk Guide, “Initiation and Management of a Science Partnership.” The NSC also contributed to the Federal Crowdsourcing and Citizen Science Toolkit to broaden and strengthen the engagement of citizen science on public lands, and began planning of the Citizen Science Pilot Program aimed at funding citizen science projects.



On the Horizon

- Implementation of the BLM's Citizen Science Pilot Program (following issuance of an IM asking the field for pilot project proposals); science communications products highlighting these projects and partnerships.
- Broader distribution of Federal Crowdsourcing and Citizen Science Toolkit and other resources to help BLM staff and partners tap citizen science.
- Potential designation of science liaisons with the BLM's science partners (per the Advancing Science Strategy (Strategy 2.2, Action 4).



SCIENCE PRIORITIES AND BUDGET

Advancing Science Strategy (Strategy 2.3, Action 1)
Identify and prioritize science needs annually, and make recommendations to the ELT and WO on funding priorities.

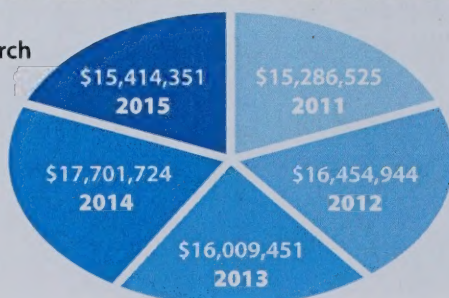
Investing in science, data, and technology development to inform land management decisions on priority issues is nothing new for the BLM. (Figure 2 provides an overview of recent BLM investments in research and development.) Notable examples of investments for projects at the national scale include Greater Sage-Grouse and Sagebrush Science; Rapid Ecoregional Assessments (REAs); the Assessment, Inventory and Monitoring (AIM) Strategy; Renewable Energy support; U.S. Geological Survey (USGS) projects; and Cooperative Ecosystem Studies Units (CESU) activities. State and field offices have also been empowered to allocate funds for science to address local management needs.

The Advancing Science Strategy, however, recognized the need to improve how the BLM identifies science needs and how it determines which have greater priority. By identifying and ranking science needs on a yearly basis, the BLM will be better able to communicate its needs to science providers and to make appropriate funding allocations.

Figure 2. BLM Research and Development, 2009 – 2015 (\$ millions).

	2009	2010	2011	2012	2013	2014	2015	Total
Research	5.6	8.0	15.3	16.4	16.0	17.7	15.4	30.0
Development	1.1	1.1	0.8	0.6	0.9	1.1	1.0	19.8
Total	6.7	9.1	16.1	17.0	16.9	18.8	16.4	100.6

BLM Research Outlays



Key Accomplishments

Coordination between the NSC and the WO in FY 2016 resulted in an agreement to use a consistent term in science project proposal titles so the BLM may more easily identify, compile, and track science-related funding needs and requests. Per WO guidance, the term “SCI” will apply to projects that “answer research questions using the scientific method or develop tools/products to aid in applying research results that inform agency management questions.”

In addition, in FY 2016 the NSC reviewed existing information and processes, as well as funding allocated to USGS and CESU projects, to help identify possible gaps in science investments. The NSC also identified challenges that have historically made it more difficult to develop a consistent approach to science investments (e.g., reactive vs. proactive investments in science/data, the lack of a systematic process for tracking investments, different ideas about what constitutes “science,” and the absence of a subactivity or budget identifier for science).

On the Horizon

- Meeting of an NSC-sponsored team (January 2017) to develop recommendations for the ELT on how the BLM can take a consistent investment approach on priority science themes for FY 2018, including climate change, sage-grouse, reclamation driven by disturbance tracking, and science needs identified through the REA process.
- Participation in the selection of research projects on the National Conservation Lands (FY 2017).

FEATURED SCIENCE INTEGRATION ACCOMPLISHMENT

Investing in Applied Science: National Conservation Lands Research Support Program

The NSC worked with the BLM's National Conservation Lands Research Support Program to provide support for scientific research performed by partners. Begun in 2008, the program seeks to increase the effectiveness of resource management and decisionmaking. Funded projects focus on National Conservation Lands, with priority given to research that will produce results transferrable to other public lands. So far, the program has funded 215 projects with nearly \$3.9 million (see Figure 3). For some projects, the funding mechanism will be through existing assistance agreements with the BLM's local partners; for others, through CESU networks.

In FY 2016 alone the program provided \$397,000 to 17 research projects in such fields as wildlife biology, recreation, paleontology, and cultural resources. For example, research projects:

- Used citizen science to inventory paleontology resources in wilderness study areas (Montana)
- Inventoried coastal meadow pollinator habitats of the San Juan Islands National Monument (Oregon)
- Inventoried and assessed status and ecological condition of wetlands within national trails management corridors (Wyoming)
- Assessed the success of inoculating big sagebrush seedlings with fungi in post-fire plantings in the Morley Nelson Snake River Birds of Prey National Conservation Area (Idaho)
- Investigated inter-marsh movements of Amargosa vole populations to better manage this endangered species along the Amargosa Wild and Scenic River (California)
- Tested the use of remote sensing data to survey for prairie dog towns important to endangered black-footed ferrets in the Rio Grande del Norte National Monument (New Mexico)

Figure 3. Funded projects.

Fiscal Year	Number of projects funded	Funding
2008	11	\$148,000
2009	20	\$326,000
2010	29	\$506,000
2011	36	\$497,000
2012	37	\$547,000
2013	24	\$539,000
2014	23	\$500,000
2015	18	\$400,000
2016	17	\$397,000
Total	215	\$3,860,000



National Trail Management Corridor, WY



Wilderness Study Area, MT



San Juan Islands National Monument, OR

SCIENCE PROFICIENCY

*Advancing Science Strategy (Strategy 2.2, Action 2)
Recommit to employee technical training and staff attendance at scientific meetings and conferences to maintain currency and knowledge of best available science and build connections with their professional communities of practice. This could be facilitated through incentives, awards, direction in the annual work plan directives, and messaging through the BLM Director and ELT.*

*Advancing Science Strategy (Strategy 1.2, Action 2)
Promote the establishment of scientifically trained science coordinators/advisors in each state and in the WO-300 Directorate (either full time or collateral duty) to develop and communicate new policies and procedures, communicate science-land management integration successes, and help identify and communicate science needs priorities.*

A central theme in the Advancing Science Strategy is maintaining science proficiency: “To be most effective in achieving its mission, the BLM should continue efforts to advance a culture that makes it a priority for employees to remain current on the most up-to-date science and the latest research of their peers...” This theme was resoundingly reinforced through the Science Information Survey. With the completion of other high-priority actions in FY 2016, the NSC will now be able to devote more effort toward promoting science proficiency—in particular, through collaboration with the BLM’s National Training Center.

Key Accomplishments

Science Information Survey findings reaffirmed the critical importance of maintaining science networks and personal communications with experts. In

response, the NSC incorporated language in FY 2017 Planning Target Allocations directives to support attendance at statewide workshops, professional meetings, and technical trainings. In addition, through NSC Chair Jon Raby, field committee members were encouraged to designate state science coordinators and points of contact for each WO Assistant Directorate (AD). To date, 6 of 11 states, 4 of 5 ADs, and the NOC have designated science coordinators. These science coordinators will facilitate communication and continuity in advancing science.

On the Horizon

- Online training and resource tools to continue making the “Principles and Practices of Integrating Science in Land Management” a part of the bureau’s culture and programs.
- Inclusion of the “Principles and Practices of Integrating Science into Land Management” in bureau-wide basic training programs, such as Pathways, and in program-specific training.
- Training on how to incorporate the Guidelines for “Principles and Practices of Integrating Science into Land Management” into NEPA and RMP templates and guidance (to be developed with WO planning and NEPA staff).
- Continued advocacy for the designation of state and WO science coordinators to facilitate communication and consistent implementation of the Advancing Science Strategy goals.

Maintaining science proficiency in the BLM workforce is essential for carrying out the BLM's multiple use and sustained yield mandate. Travel in support of professional trainings should be given priority consideration by managers and supervisors when developing travel and training plans for their respective administrative units. Incorporating science into national, regional, and state program meeting agendas is highly encouraged. Such science training, including the areas of management of the sagebrush biome, climate change, and landscape-level assessments should be a focus in FY 2017; and offices should manage their travel ceilings to ensure their employees stay current in their respective fields of expertise.

FY 2017
BLM Planning Target Allocation Directive

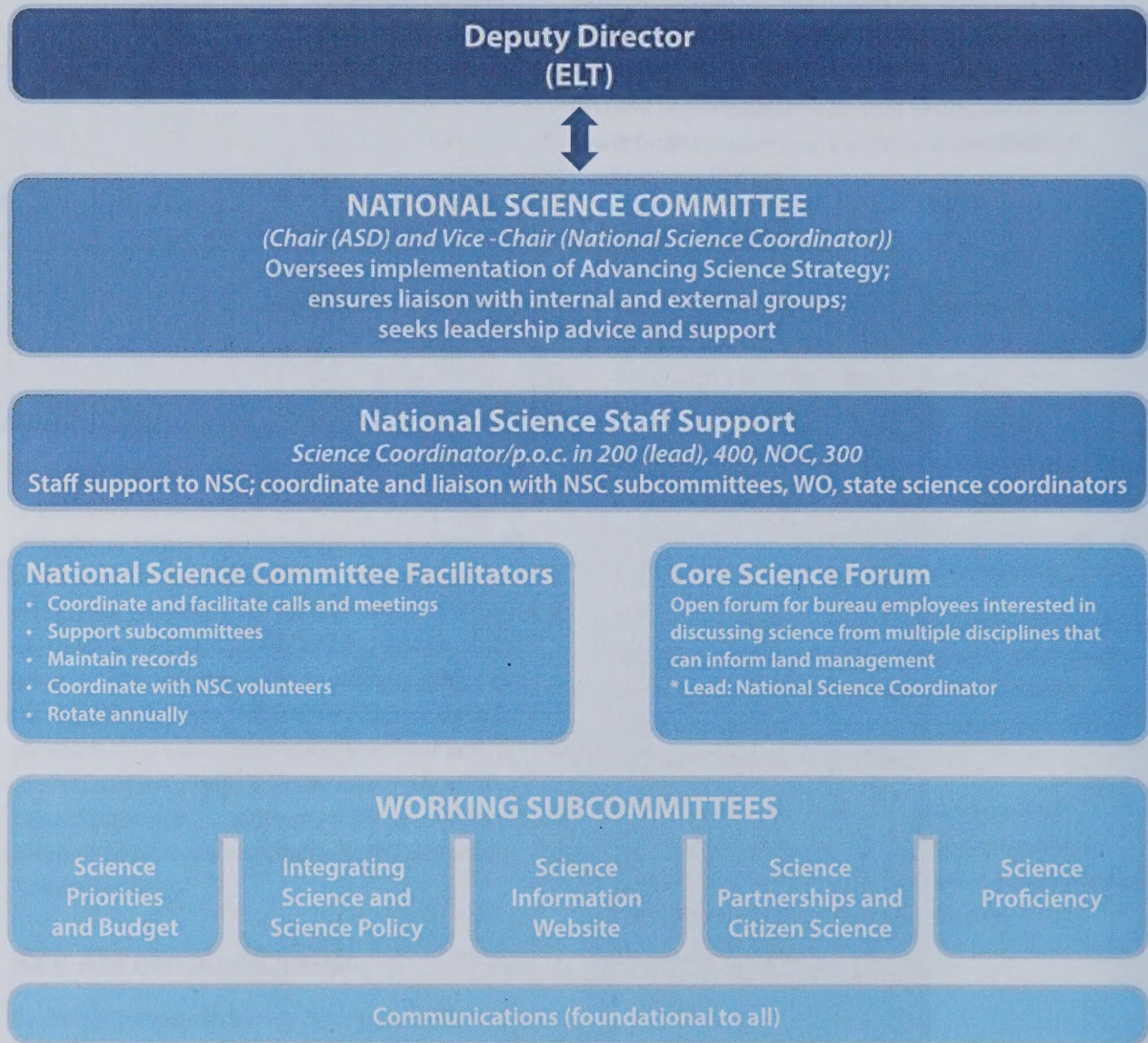


THE NSC'S FUTURE

To build on the momentum begun in its inaugural year, the NSC has developed the governance structure depicted in the Figure 4. The structure may evolve as actions are completed and new

issues arise. The NSC hopes to continue broadening engagement across the bureau through volunteers, program specialists, and leadership.

Figure 4. NSC Governance Structure 9/1/16.



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